



**BASIN ELECTRIC  
POWER COOPERATIVE**

A Touchstone Energy® Cooperative 

# Managing Drones

Mark Scheele

Chief Pilot / UAS Program Manager

# Managing Drones

- Why we started a drone program
- Who should run a drone program
- What does oversight actually look like
- Selecting the right drones
- What we are doing with drones at Basin Electric
- What others are doing with drones

# What is a Drone?

# What is a Drone?

- Drone
- Unmanned Aircraft (UA)
- Unmanned Aircraft System (UAS)
  - UA
  - Ground control station
  - Data link
  - Payload



Source: DJI. | [www.gao.gov](http://www.gao.gov)



# Starting a Drone Program

# Starting a Drone Program

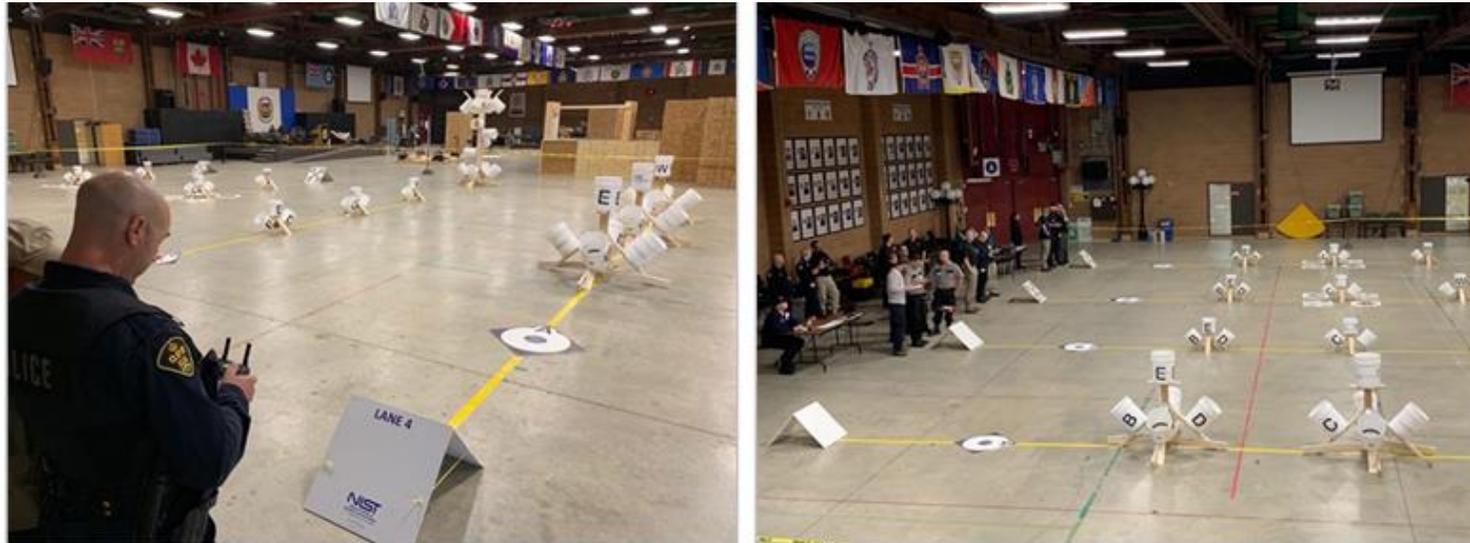
- Put a project team together
  - Include potential remote pilots and those who would benefit from drones
- Collect information from other operators
  - Organization of their program
  - Documentation
  - Use cases

# Starting a Drone Program

- Dedicated drone department
  - Includes full time drone pilots and support staff
  - Complete projects from conception to finished product
- Decentralized drone department
  - UAS Program Manager to oversee drone operations
  - Departments with business need operate drones
  - Drone team helps with one-off projects for other departments

# Starting a Drone Program

- Challenges with a decentralized program
  - Remote pilot not always available when needed
  - Keeping remote pilots current



- Remember the main point is oversight
  - Structure can be adjusted as needed, get the oversight piece right

# Who's in Charge?

# Who's in Charge?

- If you have a manned aviation program, that's where your drone program should be housed
  - Drones are an aviation activity
  - There is a lot of aviation specific knowledge needed to fly drones safely and legally
    - FAA Regulations (Part 91, Part 107)
    - Airport operations and traffic patterns
    - Airspace

# Airspace Classification

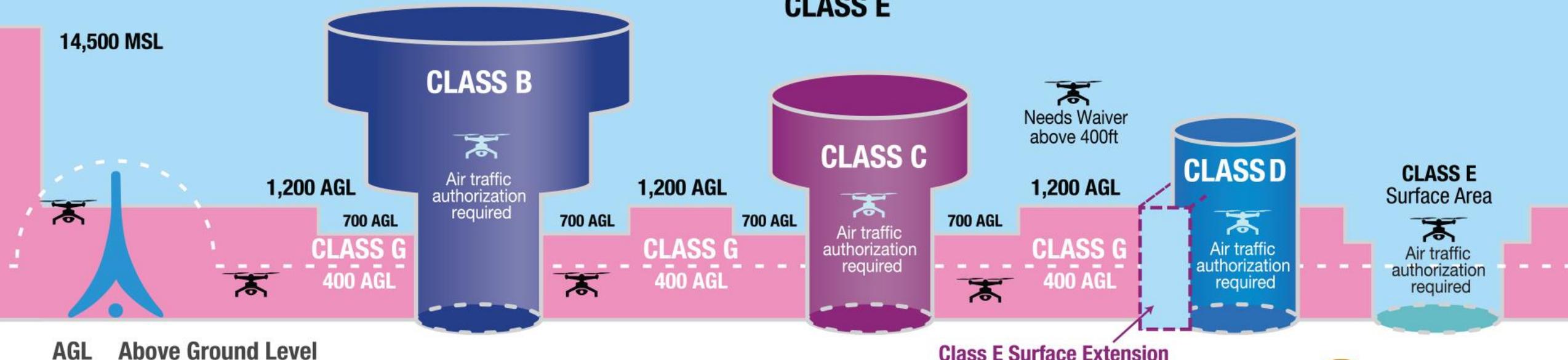
Upper Limit Undefined

CLASS E

FL 600  
18,000 MSL

CLASS A

CLASS E



AGL Above Ground Level  
FL Flight Level  
MSL Mean Sea Level

Class E Surface Extension

Airspace Guidance for Small UAS Operators



Federal Aviation Administration

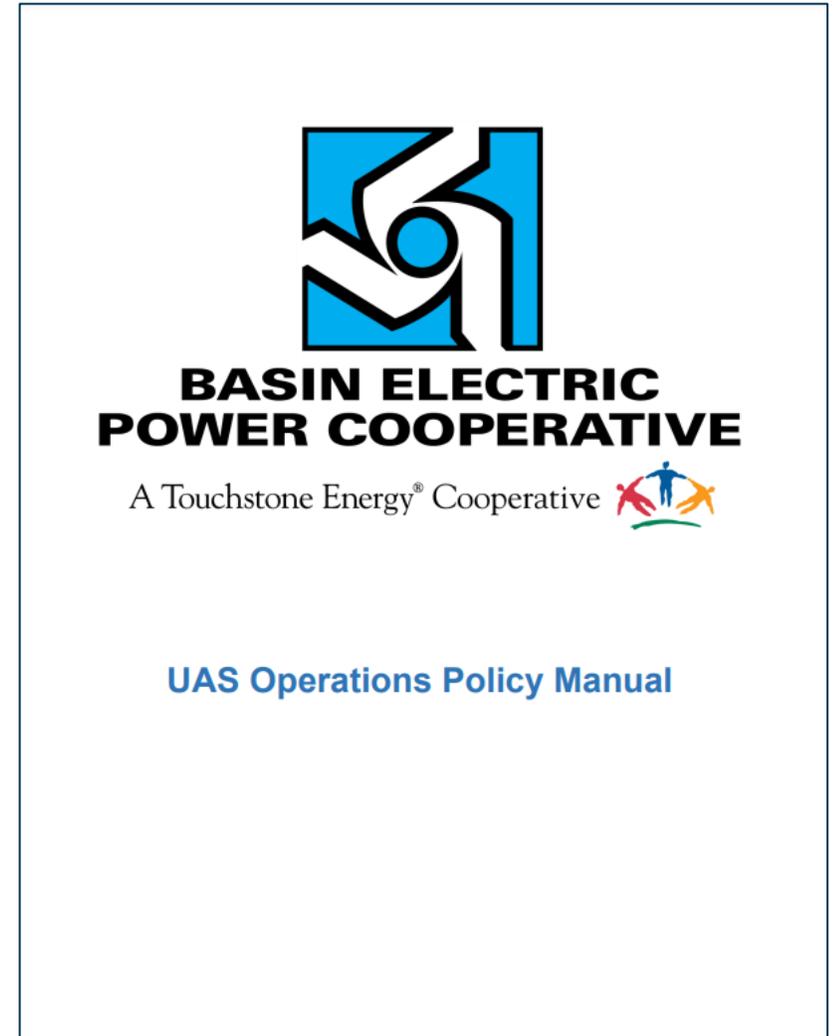
# Who's in Charge?

- If you don't have a manned aviation program:
  - Find someone who has aviation knowledge or support someone in building aviation knowledge
  - Private pilot ground school and written exam at minimum
  - Beware of the drone enthusiast
    - Main role of a program manager is oversight, not necessarily flying

# Oversight

# Drone Program Oversight

- Who are your drone pilots
  - Part 107 certificate
- What drones do you have
  - FAA registered
  - Properly marked
- UAS Operations Policy Manual
  - Governing document for all UAS operations
- What are your pilots doing with drones
  - Tracking actual operations



# Drone Program Oversight

**Manage**

Operations

✓ Missions

Logs

Flights

Authorizations

Checklists

Risk Assessments

Maintenance

Incidents

Assets

Aircraft

Batteries

Procedures

Workflows

Checklists

Risk Assessments

Custom Airspace

Admin

**Missions**
ADD MISSION

+ ADD FILTER
CLEAR FILTERS

COLUMNS
APPLY ACTION
DENSITY
EXPORT

| <input type="checkbox"/> | Mission Name                           | Status    | Start Date              | Pilot In Command | Crew             | Risk Level | Airspace Type |
|--------------------------|----------------------------------------|-----------|-------------------------|------------------|------------------|------------|---------------|
| <input type="checkbox"/> | WY, E&C, LRS Emergency Holding Pon...  | Approved  | 01/31/2024 10:30 PM MST | Kohler, Robert   | Kohler, Robert   |            | Clear Airsp   |
| <input type="checkbox"/> | WY, E&C, LRS Stockpile Surveys         | Approved  | 01/31/2024 3:00 PM MST  | Kohler, Robert   | Kohler, Robert   |            | Clear Airsp   |
| <input type="checkbox"/> | WY, E&C, LRS Coal and Limestone Sur... | Approved  | 01/31/2024 7:32 AM MST  | Kohler, Robert   | Kohler, Robert   |            | Clear Airsp   |
| <input type="checkbox"/> | MT, MLC, Blast Profiling               | Approved  | 01/25/2024 9:00 AM MST  | Dow, Jacob       | Dow, Jacob       |            | Clear Airsp   |
| <input type="checkbox"/> | ND, Comm, HDQ - Mavic 3 Pro Testing    | Completed | 01/12/2024 11:00 AM CST | Hardy, Michael   | Hardy, Michael   |            | Authorizati   |
| <input type="checkbox"/> | ND Comm PGS workers                    | Completed | 12/15/2023 12:32 PM CST | Wheeler, Gregory | Wheeler, Gregory | 25%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm Wartsila PGS arrival           | Completed | 12/15/2023 12:04 PM CST | Wheeler, Gregory | Wheeler, Gregory | 16%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm Wartsila Transport             | Approved  | 12/14/2023 11:58 AM CST | Wheeler, Gregory | Wheeler, Gregory | 13%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm DGC Pipeline                   | Completed | 12/06/2023 1:42 PM CST  | Wheeler, Gregory | Wheeler, Gregory | 23%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm DGC Pipeline                   | Completed | 12/06/2023 1:42 PM CST  | Wheeler, Gregory | Wheeler, Gregory | 23%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm Pioneer Station Aerials II     | Completed | 12/06/2023 9:21 AM CST  | Wheeler, Gregory | Wheeler, Gregory | 20%        | Clear Airsp   |
| <input type="checkbox"/> | ND Comm Pioneer Station Aerials        | Completed | 12/06/2023 9:04 AM CST  | Wheeler, Gregory | Wheeler, Gregory | 20%        | Clear Airsp   |

# Drone Program Oversight

- Don't forget about vendors and contractors
- Insurance
  - May need a separate aviation policy
  - Insurance requirements for vendors

# Selecting the Right Drone

# Selecting the Right Drone

- Experience verses need
  - May need to build experience before need develops
  - Don't want inexperienced drone pilots on complicated projects
- Don't always know what capabilities you need starting out
  - Start with a basic, but capable drone
  - Don't get enthralled with the greatest technology
- Drones are computers, they have a lifespan



# Selecting the Right Drone

- To DJI or not to DJI
  - Current leader in drone industry
  - Cybersecurity Guidance (FBI & CISA)
  - National Defense Authorization Act of 2024
- Blue UAS Cleared List
  - Skydio, Flighwave, Harris Aerial, Easy Aerial, Inspired Flight, BlueHalo, Wintra, Ascent AeroSystems, senseFly, Freerfly Systems



**CYBERSECURITY GUIDANCE:  
CHINESE-MANUFACTURED UAS**

**OVERVIEW**  
Chinese-manufactured unmanned aircraft systems (UAS), more commonly referred to as drones, continue to pose a significant risk to critical infrastructure and U.S. national security. While any UAS could have vulnerabilities that enable data theft or facilitate network compromises, the People's Republic of China (PRC) has enacted laws that provide the government with expanded legal grounds for accessing and controlling data held by firms in China. The use of Chinese-manufactured UAS requires careful consideration and potential mitigation to reduce risk to networks and sensitive information. The Cybersecurity and Infrastructure Security Agency (CISA) and the Federal Bureau of Investigation (FBI) encourage U.S. critical infrastructure owners and operators to procure UAS that follow secure-by-design principles, including those manufactured by U.S. companies. CISA and FBI further recommend following principles and implementing cybersecurity recommendations listed in this guidance to any organization procuring and operating UAS.

**THREAT**  
The White House's 2023 National Cybersecurity Strategy and the Annual Threat Assessment from the Office of the Director of National Intelligence both recognize the PRC as the most advanced, active, and persistent cyber threat to the United States. Their analysis describes how the PRC expanded cyber operations to challenge the global order and U.S. interests. Central to this strategy is the acquisition and collection of data - which the PRC views as a strategic resource and growing arena of geopolitical competition.<sup>1</sup>

Since 2015, the PRC has passed or updated comprehensive national security, cybersecurity, and data privacy laws and regulations, expanding their oversight of domestic and foreign companies operating within China.<sup>2</sup> One of these laws, the PRC's 2017 National Intelligence Law, compels Chinese companies to cooperate with state intelligence services, including providing access to data collected within China and around the world. This includes prominent Chinese-owned UAS manufacturers that the Department of Defense has identified as "Chinese military companies" operating within the United States.<sup>3</sup> The 2021 Data Security Law expands the PRC's access to and control of companies and data within China and imposes strict penalties on China-based businesses for non-compliance.<sup>4</sup> The data collected by such companies is essential to the PRC's Military-Civil Fusion strategy, which seeks to gain a strategic advantage over the United States by facilitating access to advanced technologies and expertise.<sup>5</sup> The 2021 Cyber Vulnerability Reporting Law requires Chinese-based companies to disclose cyber vulnerabilities found in their systems or software to PRC authorities prior to any public disclosure or sharing overseas. This may provide PRC authorities the opportunity to exploit system flaws before cyber vulnerabilities are publicly known.<sup>6</sup>

**The use of Chinese-manufactured UAS in critical infrastructure operations risks exposing sensitive information to PRC authorities, jeopardizing U.S. national security, economic security, and public health and safety.**

cisa.gov    Central@cisa.gov    @CISA.gov | @CISACyber    @cisa.gov    As of January 17, 2024

# What are We Doing with Drones?

# Flight Department

## Dakota Gasification Company Critical Roof Inspections





# Flight Department

## Leland Old Station Expansion Joint Inspection



# Flight Department



# Communications

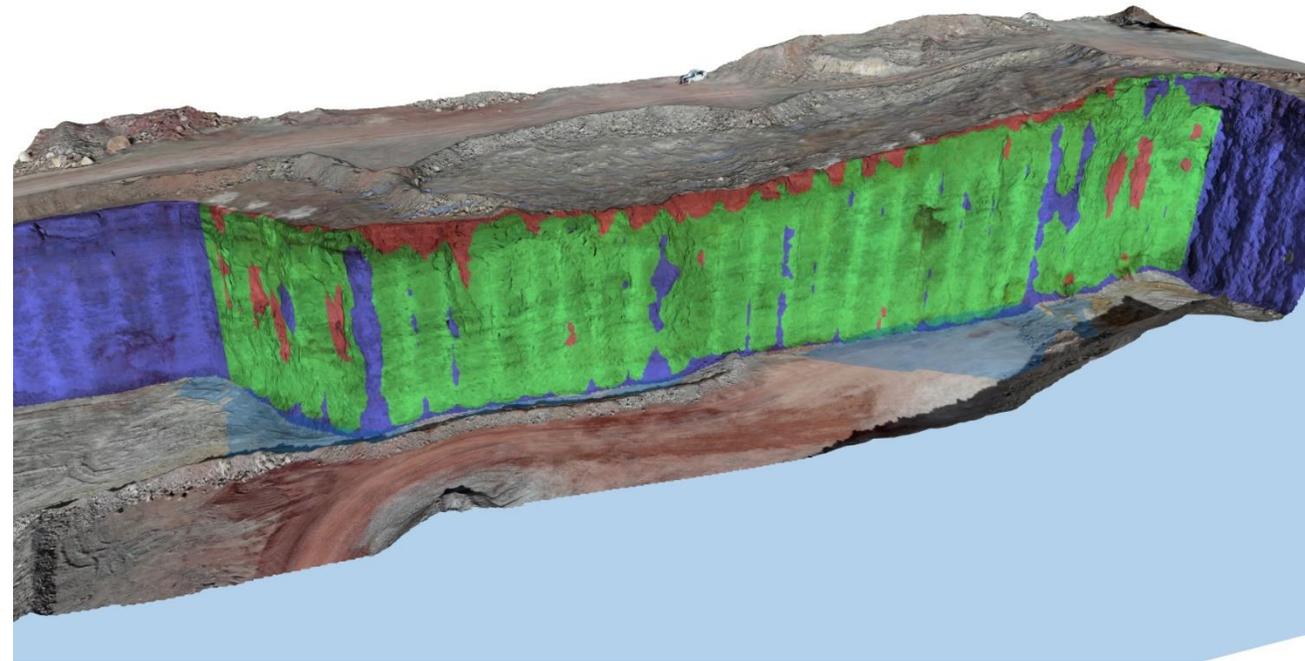
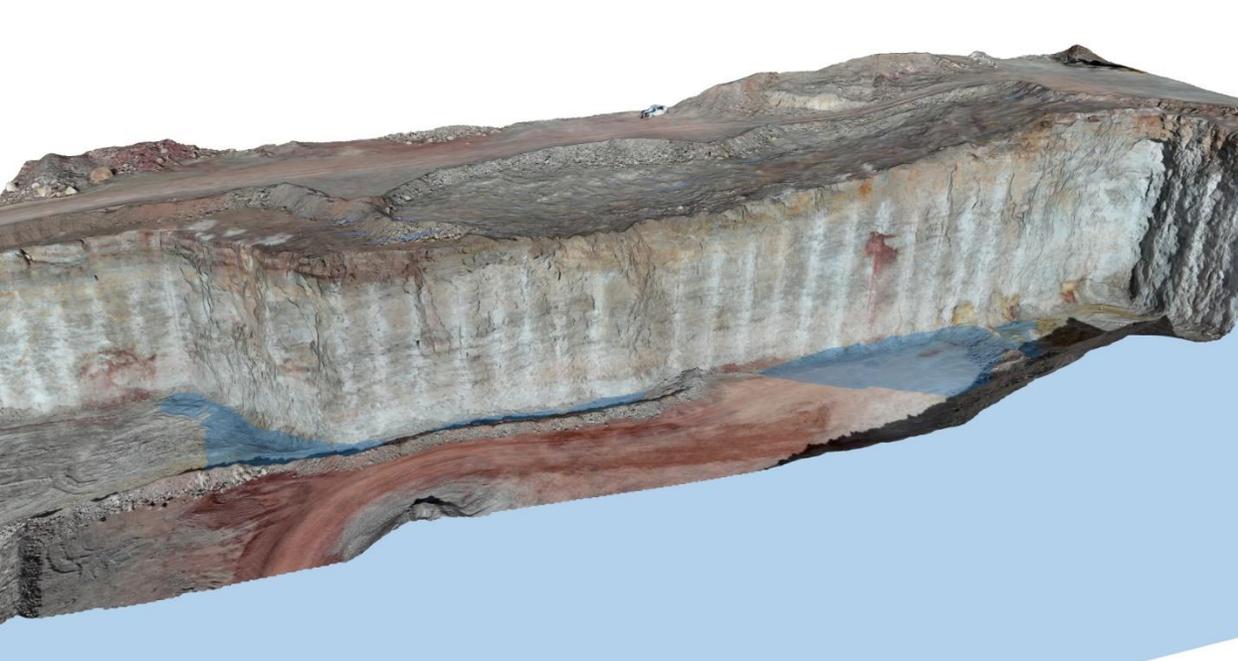


# Communications



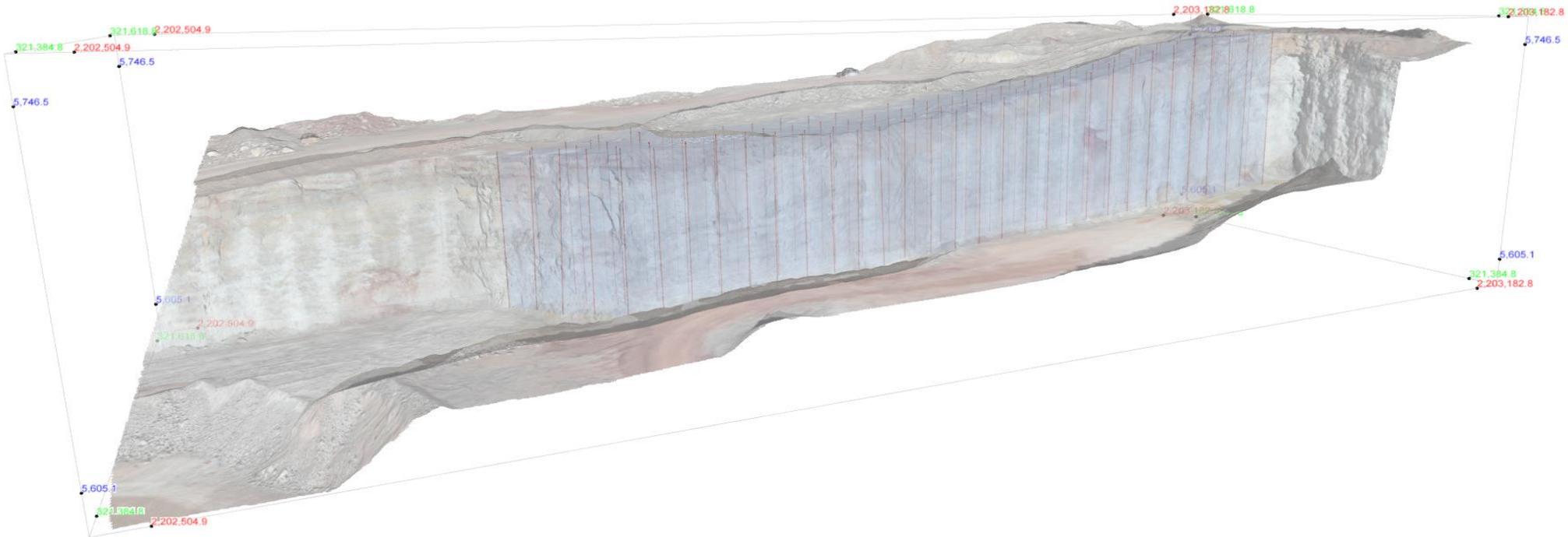
# Dakota Coal Company

## Montana Limestone Company 3D Blast Design Software



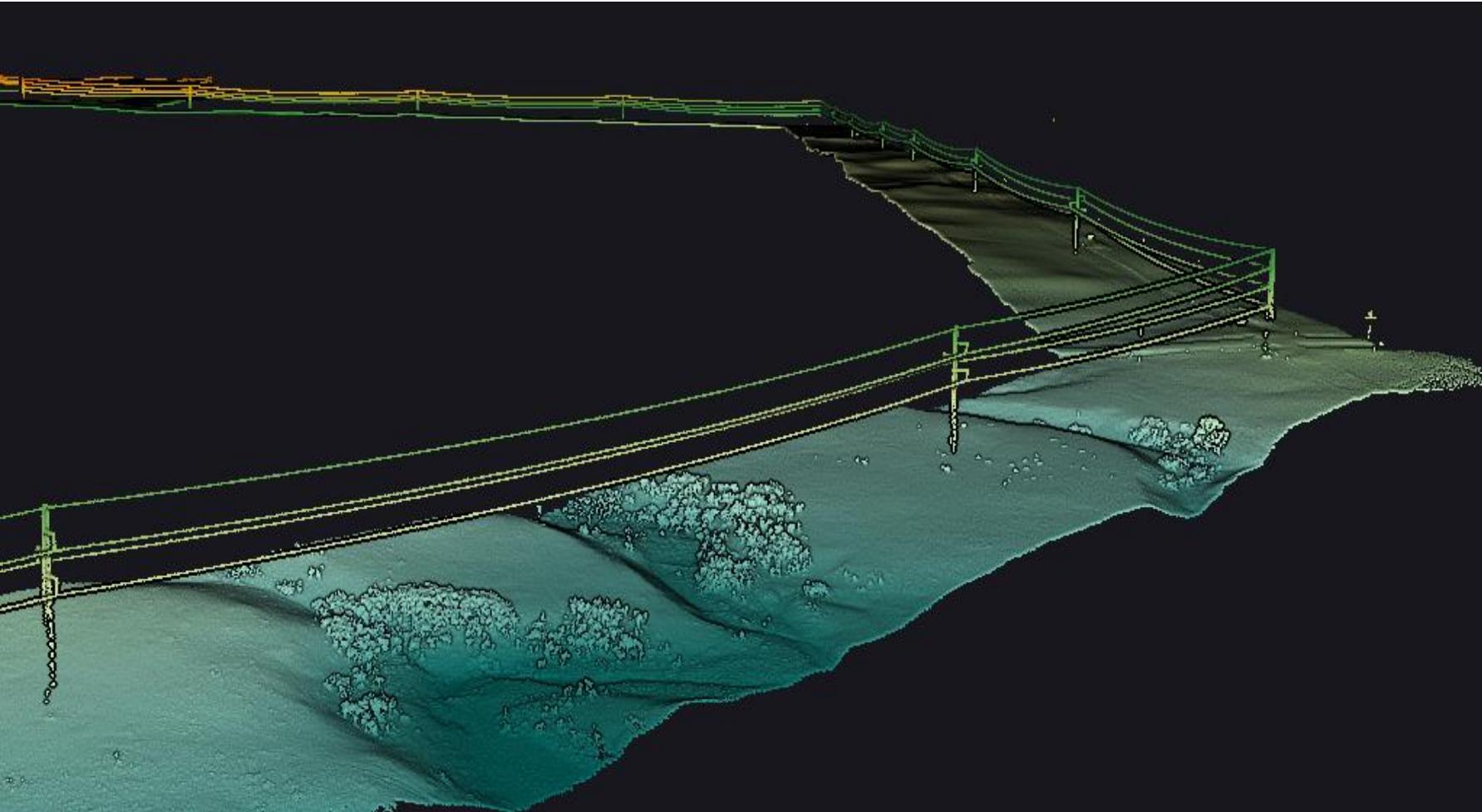
# Dakota Coal Company

## Montana Limestone Company 3D Blast Design Software





# Engineering Department



## Topographic Surveys

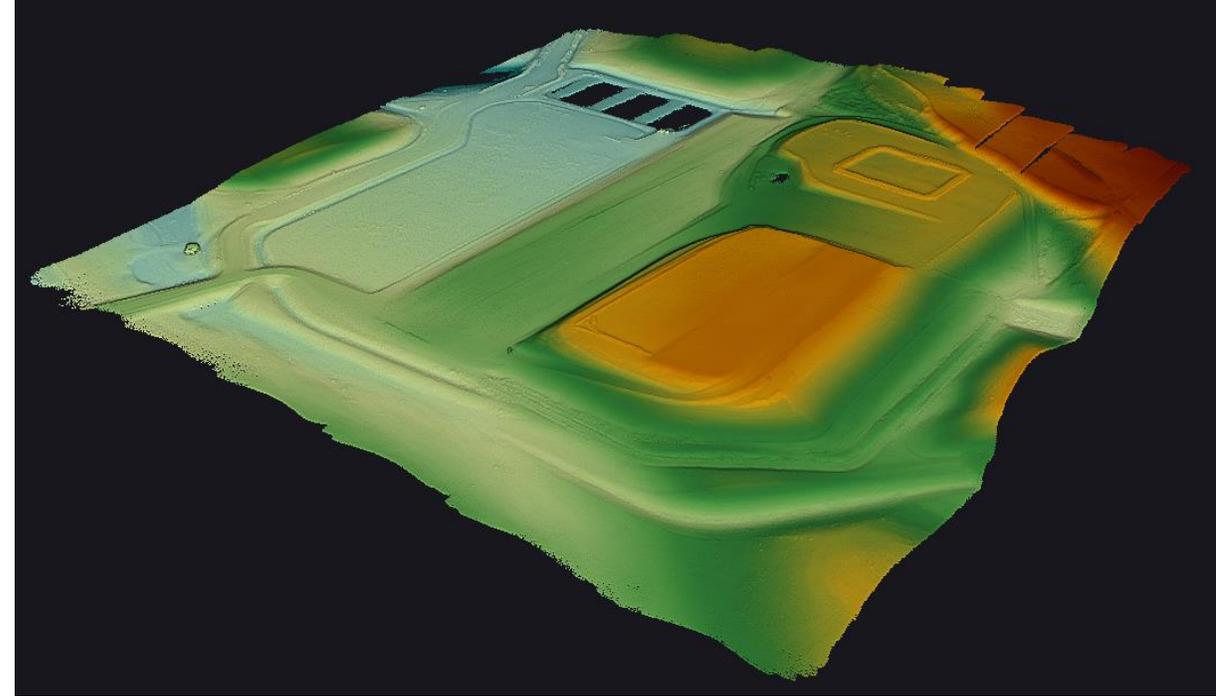
- Transmission systems
- Substations
- Facility locations
- Civil site plans

## As-build Inspections

- Conductor sags
- Structure height and wire attachment height
- Correct pole placement
- Damage inventory
- Ground elevation verification
- Reclamation

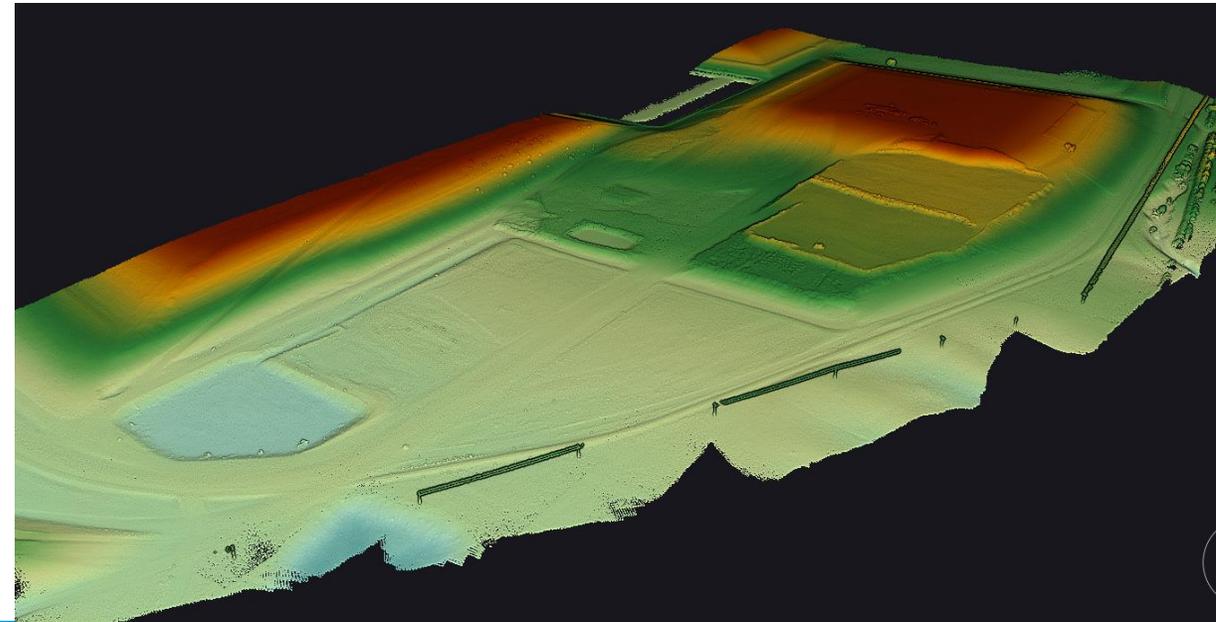
# Dry Fork Station

Ash Landfill Volumetric Survey



# Laramie River Station

Ash Landfill Volumetric Survey



# Beyond Line-of-Sight

# Beyond Line-of-Sight

- See and Avoid
  - Drones can't see and avoid
    - Restrict airspace
    - Keep drone within visual line-of-sight
- Sense and Avoid
  - Vantis network

# Beyond Line-of-Sight

## Vantis network and Operations Center

### THE VANTIS NETWORK

#### REMOTE INFRASTRUCTURE

- Surveillance sensors
- Command and control radios



#### BACKHAUL DATA NETWORK

- High reliability, low latency
- Scalable



#### UNMANNED AIRCRAFT SYSTEM (UAS)

- Ground control station
- Aircraft



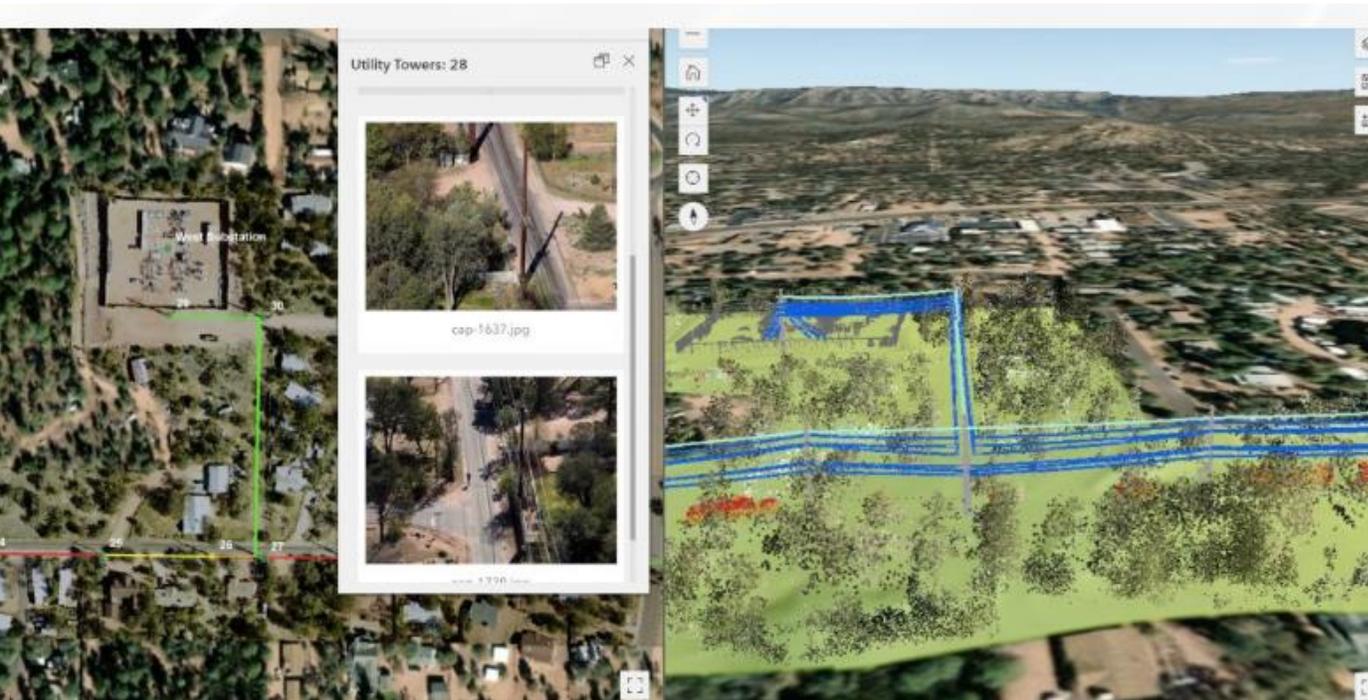
#### MISSION & NETWORK OPERATIONS CENTER

- Data correlation and validation
- Maintenance monitoring
- System testing



# Beyond Line-of-Sight

- Preparing for the future
  - Take advantage of current technology
    - Camera system for line patrol



# Emerging Drone Technology

# Emerging Drone Technology

- Wind turbine blade inspections
- Solar panel inspections
  - Infrared
- Boiler inspections
- Bird nest survey
- Beginning of line patrol and beyond line-of-sight
  - Xcel Energy

# Emerging Drone Technology

- Drone-in-a-Box
  - Permanently placed system
  - Programmable from anywhere
  - No need for person on-sight



# Emerging Drone Technology

- Urban Air Mobility
  - Human carrying drones
  - Airbus, Joby, Uber



# Questions